Post-doc position in L2C, University of Montpellier/CNRS

Biodegradation of polymers and copolymers in oceanic environment studied by AFM

Location : L2C–University of Montpellier (France), Soft Matter and Glass Dept
Period : 12 months starting September/November 2016 (possibility of extension upon further application to the Labex)
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Funding : Labex NUMev (net monthly remuneration 2070 euros)
Key words : Biodegradation, Polymers, AFM, Oceanic environment, Mechanical properties.

The post-doc will study the mechanisms of the degradation of polymers in natural oceanic environment by direct observation of immersed polymers from the very beginning of the bacterial colonisation. Preliminary studies performed in our team by atomic force microscopy have shown that contrary to what is commonly assumed, bio-degradation starts very early (after a few weeks) and at a very small scale (scale of the individual bacteria cell) even on very non-degradable polymers like polyethylene. The aim of the post-doctoral study will be to elucidate the relative role of relevant degradation mechanisms (external and bacteria induced stresses and cracks, chemical and enzymatic degradation of polymer chains, diffusion, assimilation by bacteria) through comparison of their action and kinetics on different polymers. The incubation of polymers in sea water and the characterisation of the biotic parameters such as abundance, bacterial activity and diversity will be performed in collaboration with J.F. Ghiglione team at the laboratory of micro bacterial oceanography (LOMIC, Banyuls). AFM will be used to get access to topographical and mechanical resolved measurements of the polymer surfaces sustaining damages. Polymers and co-polymers will be selected to shed light on the role of properties heterogeneities in link with the characteristic size of the bacteria.

Expected skills : We are looking for a physicist or physico-chemist in the field of material science, with knowledge in polymers and/or mechanical properties. Good experimental skills (AFM, data/images analysis) are strongly welcome. An interest in biology is also a key point.